

What is claimed is:

1. A vapor compression system comprising:
a compression device to compress a refrigerant to a high pressure;
a heat rejecting heat exchanger for cooling said refrigerant, and a fluid accepts heat from said refrigerant;
an expansion device for reducing said refrigerant to a low pressure;
a valve to control a flow of refrigerant between a discharge of said compression device and an inlet of said expansion device; and
a heat accepting heat exchanger for evaporating said refrigerant.
2. The system as recited in claim 1 wherein said fluid is water.
3. The system as recited in claim 1 further including a sensor that detects a defrosting condition of said heat accepting heat exchanger and a control, and said control opens said valve when said sensor detects said defrosting condition.
4. The system as recited in claim 3 wherein said refrigerant from said compressor flows through said valve, through said expansion device, and through heat accepting heat exchanger to melt frost on said heat accepting heat exchanger.
5. The system as recited in claim 3 wherein said control closes said valve when said sensor does not detect said defrosting condition.
6. The system as recited in claim 1 further including a pump that draws said fluid through said heat rejecting heat exchanger.
7. The system as recited in claim 6 wherein said control closes said pump when said control opens said valve.
8. The system as recited in claim 1 wherein said refrigerant is carbon dioxide.

9. The system as recited in claim 3 further including a second valve positioned between a discharge of said compression device and said gas cooler, and said control closes said second valve when said sensor detects said defrosting condition.

10. The system as recited in claim 3 further including a second valve positioned between said gas cooler and an inlet of said expansion device, and said control closes said second valve when said sensor detects said defrosting condition.

11. The system as recited in claim 3 wherein said valve includes a first port in fluid communication with a discharge of said compression device, a second port in fluid communication with said heat rejection heat exchanger, and a third port in fluid communication with an inlet of said expansion device, and said control closes said second port and opens said third port when said sensor detects said defrosting condition and said control opens said second port and closes said third port when said sensor does not detect said defrosting condition.

12. The system as recited in claim 3 wherein said valve includes a first port in fluid communication with an inlet of said expansion device, a second port in fluid communication with said heat rejection heat exchanger, and a third port in fluid communication with a discharge of said compression device, and said control closes said second port and opens said third port when said sensor detects said defrosting condition and said control opens said second port and closes said third port when said sensor does not detect said defrosting condition.

13. The system as recited in claim 1 wherein said expansion device is adjusted to control one of an inlet temperature of said refrigerant in said heat rejection heat exchanger, a power of said compressor, and said high pressure.

14. A vapor compression system comprising:
a compression device to compress a refrigerant to a high pressure;
a heat rejecting heat exchanger for cooling said refrigerant, and a fluid accepts heat from said refrigerant;
a pump that draws said fluid through said heat rejecting heat exchanger;
an expansion device for reducing said refrigerant to a low pressure;
a valve to control a flow of said refrigerant between a discharge of said compression device and an inlet of said expansion device;
a heat accepting heat exchanger for evaporating said refrigerant;
a sensor that detects a defrosting condition of said heat accepting heat exchanger;
and
a control that opens said valve when said sensor detects said defrosting condition, and said hot refrigerant from said compressor flows through said valve, through said expansion device, and through heat accepting heat exchanger to melt said frost on said heat accepting heat exchanger.
15. The system as recited in claim 14 wherein said control closes said valve when said sensor detects none of said frost on said heat accepting heat exchanger.
16. The system as recited in claim 14 wherein said control closes said pump when said control opens said valve.
17. The system as recited in claim 14 wherein said refrigerant is carbon dioxide.

18. A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

- providing a heat accepting heat exchanger;
- compressing a refrigerant to said high pressure;
- cooling said refrigerant by exchanging heat with a fluid, and said fluid accepts heat from said refrigerant;
- expanding said refrigerant to a low pressure;
- evaporating said refrigerant in said heat accepting heat exchanger;
- sensing a defrosting condition of said heat accepting heat exchanger;
- flowing refrigerant from the step of compression to the step of expansion; and
- melting frost on said heat accepting heat exchanger when the step of sensing said defrosting condition indicates said defrosting condition is necessary.

19. The method as recited in claim 18 further including the steps of sensing no frost on said heat accepting heat exchanger and blocking the flow of refrigerant from the step of compression to the step of expansion.

20. The method as recited in claim 18 wherein said refrigerant is carbon dioxide.